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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/611,619	06/30/2003	Zhong-Ning Cai	42P17030	1417

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EXAMINER

PATEL, KAUSHIKKUMAR M

ART UNIT PAPER NUMBER

2188

DATE MAILED: 03/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/611,619	<b>Applicant(s)</b> CAI ET AL.	
	<b>Examiner</b> Kaushikkumar Patel	<b>Art Unit</b> 2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 20 January 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-21 and 23-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12, 14, 16, 18, 19, 21 and 23-31 is/are rejected.
- 7) ☒ Claim(s) 13, 15, 17 and 20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office Action is in response to applicant's communication filed January 20, 2006 in response to PTO Office Action mailed October 14, 2005. The Applicant's remarks and amendments to the claims and/or the specification were considered with the results that follow.
2. In response to the last Office Action, claims 1, 4, 5, 6, 11, 21, 24, 25 and 26 have been amended. Claim 22 is cancelled. Claim 31 is added. As a result, claims 1-21, and 23-31 remain pending in this application.
3. Objections to abstract and specification has been withdrawn due to amendment filed January 20, 2006.

### ***Response to Arguments***

4. Applicant's arguments with respect to claims 1-21 and 22-31 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Objections***

5. Claims 13 is objected to because of the following informalities:  
  
Claim 13, page 8, lines 1-2, "a subsystem response" should be "a memory subsystem response".  
  
Claim 17, page 9, lines 4-5, "is greater than the deactivate the occupancy level" should be "is greater than the deactivate occupancy level".

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

7. Claims 4 and 9 recite limitation "a memory" in line 3. It is not clear which memory it reads data line from? A main memory or different memory? There is insufficient antecedent basis for this limitation in the claim.

8. Claim 31 recite limitation "the memory" in line 5. There is insufficient antecedent basis for this limitation in the claim.

***Allowable Subject Matter***

9. The indicated allowability of claims 16, 18 and 24 is withdrawn in view of the newly discovered reference(s) to Schultz (US 2004/0148470 A1). Rejections based on the newly cited reference(s) follow.

***Claim Rejections - 35 USC § 102***

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

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only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

11. Claims 1-12, 14, 16, 18-19, 21, 23-31 are rejected under 35 U.S.C. 102(e) as being anticipated by Schulz (US 2004/0148470 A1).

As per claims 1 and 6, Schulz teaches a method comprising:

identifying a prefetch depth (see abstract, taught as dynamically changing prefetching of data from system memory inherently teaches identifying prefetch depth);

detecting a memory subsystem response level according to at least one bus transaction directed to a main memory (see abstract and paragraph [0043], taught as in response to read request (teaches bus transaction) dynamically adjusting prefetching of data bandwidth utilization of the memory);

prefetching data according to an adjusted prefetch depth (paragraph [0046], taught as increasing or decreasing number of prefetch cycles inherently teaches prefetching data according to adjusted prefetch depth);

adjusting the prefetch depth as changes in the memory subsystem response level are detected (paragraphs [0044] and [0046]).

As per claims 2 and 7, Schulz teaches checking of whether prefetching is enabled or not? Schultz also teaches a configuration storage to store configuration values such as number prefetch cycles and enablement of disablement, which inherently teaches querying to control register for prefetching enable/disablement and data structure to identify prefetch depth (paragraphs [0041] and [0057]).

As per claims 3 and 8, Schultz teaches configuration storage (e.g. look-up tables) for storing configuration values and enable/disablement values and use of such tables

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to (storage locations) dynamically vary prefetching. Thus, Schultz inherently teaches accessing table, defining respective depths with enabled bit and reading of prefetch depth from table entry (paragraph [0041], fig. 3, item 151).

As per claims 4 and 9, reading of the data line from memory is inherent feature of the processor after adjusting the prefetch depth.

As per claims 5 and 10, Schultz teaches continuously monitoring memory subsystem level using threshold values and adjusting prefetching from values stored in configuration storage according to changes in memory subsystem utilization values. Thus, Schultz inherently teaches identifying updates with valid bit (as Schultz also teaches enabling and disabling of prefetching) and reading of newly adjusted prefetch depth and prefetching according to updated prefetch depth (paragraphs [0043] and [0046]).

Claims 11-12, 21, 23, 26, 27 are also rejected under same rationales as applied to claims 1-10 above. As Schultz teaches an apparatus with logic (figs. 2 and 3) to dynamically vary prefetching depending on memory subsystem utilization level.

As per claims 14, 24 and 28, Schultz teaches tracking of memory subsystem requests (taught as tracking outstanding read/write request) and tracking average memory occupancy level (taught as tracking ratio of data packets to a bus cycle) (paragraphs [0043]-[0044]).

As per claim 16, Schultz teaches comparing of memory subsystem response level to activation and deactivation occupancy levels (paragraphs [0043] and [0046], taught as, if outstanding memory requests are compared against threshold values

(activate/deactivate levels) and accordingly prefetching is enabled or disabled or varied (taught in paragraph [0046])).

As per claims 19, 25 and 29, Schultz teaches tracking memory latency according to memory subsystem requests (paragraph [0045]).

As per claim 18, Schultz teaches an in order queue as the number of outstanding memory subsystem requests (paragraph [0043]).

As per claim 30, Schultz teaches an input/output controller (fig. 1, item 60).

Claim 31 is also rejected under same rationales as applied to claims 11, 14 and 16.

### ***Allowable Subject Matter***

12. Claims 13, 15, 17, and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaushikkumar Patel whose telephone number is 571-272-5536. The examiner can normally be reached on 8.00 am - 4.30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on 571-272-4210. The fax phone


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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kaushikkumar Patel  
Examiner  
Art Unit 2188

  
kmp

  
3/24/06